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A NEW MIOCENE TORTOISE FROM SOUTHERN CALIFORNIA

JAMES R. DES LAURIERS
California State College at Fullerton
Fullerton, California

In 1940 eight specimens of a Miocene tortoise were found in Barstovian aged deposits of Cajon Pass, San Bernardino County, California. This material has remained unexamined in the collection of the Los Angeles County Museum (LACM) until now.

I wish to thank Dr. Theodore Downs, Los Angeles County Museum, for the use of these specimens; and Dr. Bayard H. Brattstrom, California State College at Fullerton, for his guidance and criticism.

Gopherus dehiscus, new species

Figures 1-3

Holotype.—LACM 400(26)/5178 consists of the internal cast of an entire shell except for the anterior lip of the carapace. The bones of the plastron are present as well as most of the peripherals.

Type locality and age—LACM 400(26) Cajon Pass, W. end of Cajon Valley, NW¼ Sec. 1, NE¼ Sec. 2, T3N, R7W, SBB&M. San Antonio quad. ½ mile SW of the hwy. to Big Pines recreation area, San Bernardino Co., Calif.

Diagnosis.—A *Gopherus* closely resembling *G. mohavetus* (Merriam), (see footnote, Table 4) but differing from it in: nuchal scute not much wider than long; the length of the pectoral scute 1/6-1/8 as long as the abdominal along the midline; third vertebral sulcus crossing the fifth neural bone; epiplastral lip protruding very little if at all beyond the anterior edge of the carapace; proneural deeply notched by the first neural; inguinal scute large, so that the abdominal scute does not closely approach the inguinal notch; entoplastron at least as wide as long.

Description of the type.—(Fig. 1) The holotype consists of a small, high domed internal cast with most of the peripherals and the whole

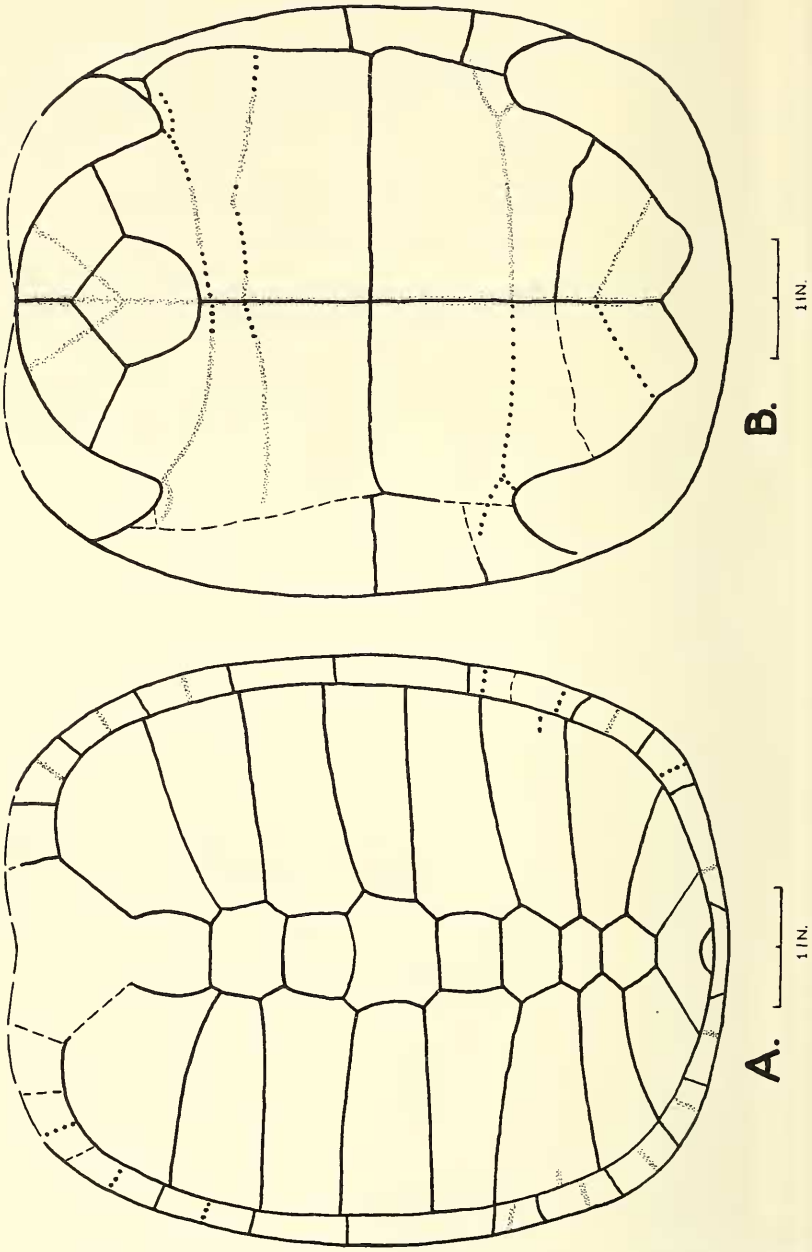

Figure 1A. Dorsal view of carapace of the holotype of *Gopherus dehiscus*, LACM 400(26)/5178. Solid lines: sutures; stippled lines: sulci; broken lines: reconstructed parts; dotted lines: extrapolated sulci. *B*. Ventral view of plastron of the holotype of *Gopherus dehiscus*, LACM 400(26)/5178. Note the abnormal bone in the axillary notch.

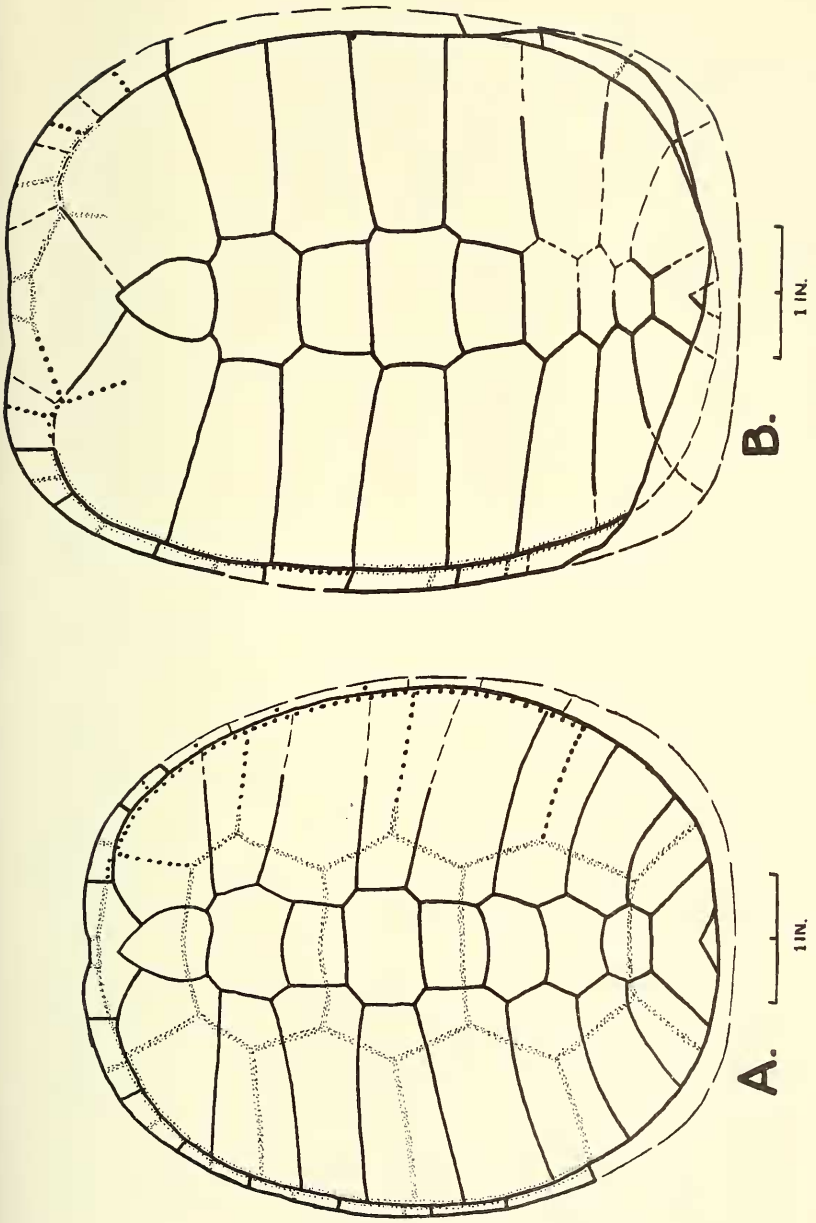

Figure 2A. Dorsal view of carapace of *Gopherus dehiscus*, LACM 400(25)/5182. The position of the peripherals and lateral margins of the shell are reconstructed. *B.* Dorsal view of the carapace of *Gopherus dehiscus*, LACM 400(45B)/5181. Posterior portion of the carapace badly eroded and position of posterior peripherals reconstructed.

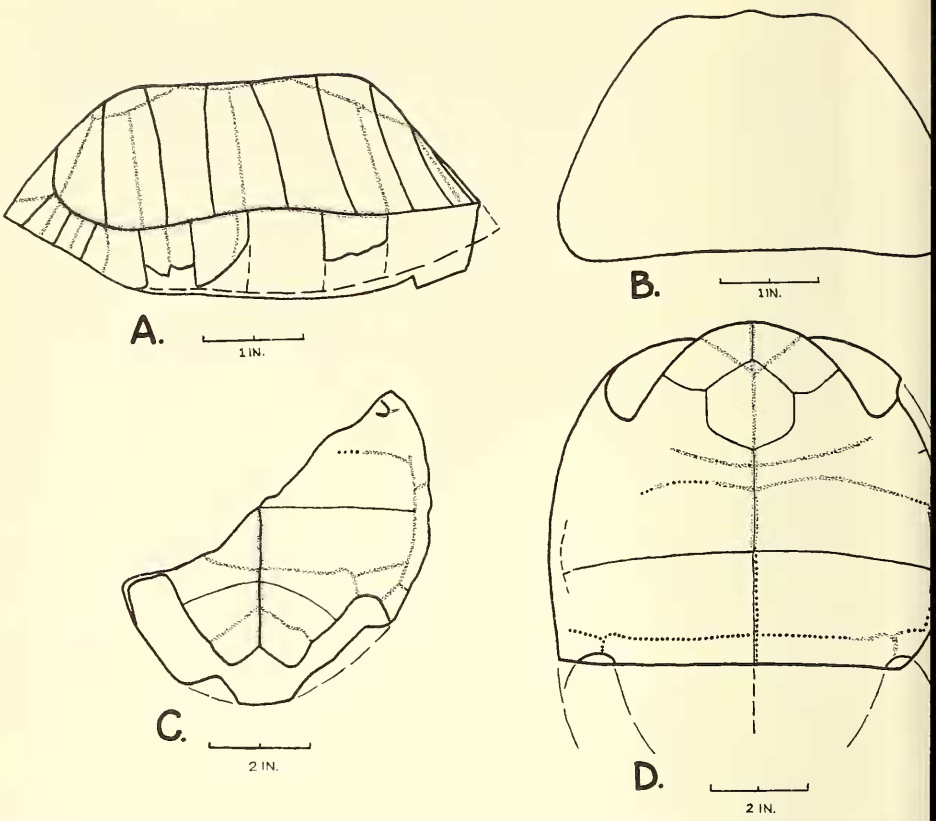

Figure 3A. Left side view of the shell of *Gopherus dehiscus*, LACM 400(25)/5182. *B.* Schematic cross section of *Gopherus dehiscus*. *C.* Ventral view of the plastron of *Gopherus dehiscus*, LACM 400(26)/5179. *D.* Ventral view of the plastron of *Gopherus dehiscus*, LACM 400(26)/5180.

plastron still present. The fossil is not distorted and the carapace has three dorsal longitudinal ridges (Fig. 3B).

The epiplastral lip does not project beyond the reconstructed carapace, and very little beyond the broken edge of the carapace. The gulo-humeral sulci meet at the midline on the entoplastron; the humeropectoral sulci probably do not touch the entoplastron. The pectoral scute narrows markedly toward the midline. The length of the pectoral scute along the midline is 1/8 that of the abdominal scute. The pectoral scute does not touch the axillary notch due to the presence of a narrow axillary scute. The inguinal scute prevents the abdominal scute from reaching the inguinal notch by contacting the femoral scute. The femoral scute narrows toward the midline.

TABLE 1

Carapace measurements of *G. dehiscus* and *G. mohavetus* (5131) in millimeters

	5178	5182	5181	5183	5184	5185	5131
carapace length*	?153.0	?140.0	?124.0	?216.8	?176.2	—	—
carapace width	127.0	?113.0	?104.0	—	161.5	—	—
central scute one length	—	—	27.5	—	—	—	92.2
central scute one width	—	28.5	?39.0	—	—	—	102.4
proneural length (greatest)	32.7	28.0	24.0	?44.2	—	—	?77.5
proneural length	—	18.0	?21.2	—	—	—	?71.5
proneural width	39.0	37.3	33.8	—	44.8	—	?85.0
neural one length	—	19.6	20.1	30.0	23.8	30.0	—
neural one width	16.6	13.8	14.0	?26.2	19.6	26.5	—
neural two length	18.0	17.7	15.8	25.0	20.0	23.2	—
neural two width	19.5	24.2	21.8	38.2	31.4	38.2	—
neural three length	15.1	14.0	12.0	23.2	20.4	24.0	—
neural three width	17.9	21.9	16.2	?34.5	31.0	32.0	—
nuchal scute length	—	8.0	6.5	—	—	—	?22.2
nuchal scute width	—	8.0	6.8	—	—	—	28.0
pleural one prox. length	22.0	18.5	19.5	27.8	25.5	24.0	—
pleural one distal length	34.5	27.5	?32.0	53.0	35.8	51.5	—
pleural two prox. length	15.2	10.2	6.4	?19.0	12.2	17.0	—
pleural two distal length	21.0	?16.8	20.5	33.8	37.0	33.7	—
pleural three prox. length	21.0	19.4	20.5	18.0	23.0	36.0	—
pleural three distal length	17.0	12.7	15.5	27.2	7.5	25.2	—

*Lengths are measured along the midline unless otherwise indicated.

The anterior edge of the plastral lobe is a smooth curve, without any notch. The entoplastron is slightly wider than long, angular in front and round behind; greatest width 29.0 mm., length on the midline 27.8 mm. The posterior plastral lobe is deeply notched on the midline, there is also a small notch where the femoro-anal sulcus reaches the margin.

The first neural is obviously elongate, even though its anterior portion has been destroyed. The second neural is octagonal; the third, tetragonal; and the fourth, octagonal. The first suprapygal is bifurcate and encloses the second suprapygal laterally. The pygal bone narrows toward the margin and is intermediate in width between the first and second suprapygals as measured along the peripheral suture. Alternate pleurals do not differ much in distal width.

There appears to be an abnormality in this specimen. In the axillary notch there is a small triangular extra bone. Its base is on the margin of the notch and its apex contacts the periphero-hyoplastral suture (Fig. 1B). Measurements of the holotype are presented in Tables 1 and 2.

TABLE 2

Plastron measurements of *G. dehiscus* and *G. mohavetus* (5131, 473) in millimeters

	5178	5182	5181	5183	5184	5185	5131	473**
plastron length*	138.5	122.5	—	—	173.5	—	—	—
plastron length (greatest)	145.0	129.9	—	—	180.9	—	—	—
gular scute length	22.0	?27.0	—	—	—	—	?24.0	—
humeral scute length	?19.9	—	—	—	—	—	—	—
pectoral scute length	?6.9	—	—	45.5	—	14.0	—	—
abdominal scute length	57.8	—	—	42.0	—	74.0	—	—
femoral scute length	17.3	16.3	14.0	12.0	30.7	—	—	—
anal scute length	14.4	12.2	—	15.8	20.0	—	—	—
entoplastron length	27.8	—	—	?42.5	27.2	42.7	78.3	45.5
entoplastron width	29.0	25.3	—	46.2	33.7	46.8	96.9	50.0
epiplastron length	11.6	—	—	—	20.5	7.4	—	—
hyoplastron length	36.8	—	—	—	46.5	51.2	—	—
hypoplastron length	40.8	33.7	—	—	40.0	57.0	—	—
xiphiplastron length	22.9	21.0	—	—	38.7	—	—	—
bridge length	72.0	?55.0	71.8	—	90.5	—	—	—

*Lengths are measured along the midline unless otherwise indicated.

**U.S.G.S. catalogue number.

TABLE 3

Shape of suture between neural one and the proneural.

	straight	slightly curved	pointed
G. dehiscus	—	—	6
G. mohavetus	—	2	—
T. milleri	1	1	1

Auffenberg (pers. comm.) indicates that "distal pleural widths are important in fossil tortoises." Further, the holotype of *G. dehiscus* displays the primitive condition. That is, alternate pleurals do not differ greatly in width. The referred material shows a similar condition with the exception of LACM 400(26)/5184 which shows alternately wide and narrow pleurals.

G. mohavetus shows the advanced condition in regard to this particular character with alternate bones differing greatly in distal width (Merriam 1919: Fig. 4A).

Referred material.—LACM 400(25)/5182, (Fig. 2A) from the same locality as the holotype is a nearly complete carapace. The posterior and all but two right peripherals are missing. Portions of the right pleurals are missing, but the sutures show clearly on the internal cast. Only one small fragment of the plastron remains. The plastral cast is so badly eroded that nothing can be said about the plastron. The complete scute pattern of the carapace is easily discernible. The left front and right rear quarters of the carapace are somewhat pushed toward the center of the shell. The proneural is deeply notched by the first neural. See Tables 1 and 2 for measurements.

LACM 400(45B)/5181, (Fig. 2B) from the same locality as the two preceding specimens. It consists of the complete cast of a small high domed shell. The posterior peripherals are missing. The anterior and left peripherals, and portions of the plastron are present. The carapace has three dorsal longitudinal ridges. The proneural is slightly notched by the first neural. There is no evident distortion in the fossil.

LACM 400(26)/5179, (Fig. 3C); LACM 400(26)/5180, (Fig. 3D) are from the same locality as the holotype and are referred to the same species. LACM 400(26)/5179 measurements: femoral scute, 19.7 mm. long; anal scute length, 21.0 mm.; hypoplas-

TABLE 4

Summary of Barstovian Tortoises of Southern California

Cajon Valley, San Bernardino Co.	Barstow Syncline area, San Bernardino Co.	Tejon Hills, Kern Co.	Cache Peak, Kern Co.
T. milleri	*T. milleri*	*G. mohavetus*	*G. depressus*
LACM 400/7450	UC 21574 (type)[1]	LACM 303/5132	LACM 498/5133 (type)
G. dehiscus	LACM 494/5129		
LACM 400(26)/5178 (type)	LACM 495/5130		
LACM 400(26)/5179	*G. mohavetus**[1]		
LACM 400(26)/5180	UC 21575 (type)		
LACM 400(45B)/5181	LACM 494/5131		
LACM 400(25)/5182	U.S.G.S. 473		
LACM 400(26)/5183	*Stylemys sp*[2]		
LACM 400(26)/5184	LACM 1751/4857		
LACM 400(26)/5185			

*The name *mohavense* does not agree grammatically with *Gopherus*. Herein the name is changed to *Gopherus mohavetus*.

[1]Merriam (1919) based his description of *Testudo mohavense* on specimens UC 21575 (type) and UC 21574. Brattstrom (1961) put *T. mohavense* in *Gopherus* but used UC 21574 as the type of his *Testudo milleri*.

[2]This specimen (A1420, now catalogued LACM 1751/4857) referred to *G. mohavense* by Brattstrom (1961:547) appears, on re-examination by Brattstrom and Des Lauriers, to be incorrectly placed and should be in *Stylemys*.

TABLE 5

Comparison of some characteristics of *G. dehiscus* and *G. mohavetus*

G. dehiscus	*G. mohavetus*
Nuchal scute little wider than long.	Nuchal scute much wider than long.
Pectoral scute 1/6-1/8 as long as abdominal along midline.	Pectoral scute ½-⅓ as long as the abdominal along midline.
Bridge length more than ½ the length of the plastron along midline.	Bridge length less than ½ the plastron length along midline.
Third vertebral sulcus crosses the fifth neural.	Third vertebral sulcus crosses the sixth neural.
Proneural deeply notched by neural one.	Proneural not notched by neural one.
Inguinal scute large.	Inguinal scute small or absent.
Entoplastron wider than long.	Entoplastron longer than wide.
Pleurals do not differ much in distal width.	Pleurals differ markedly in distal width.

tron length, 45.9 mm.; xiphiplastron length 32.8 mm.; bridge length, 99.8 mm. LACM 400(26)/5180 measurements: entoplastron length, 45.1 mm., width, 45.1 mm.; pleural two distal width, 30.8 mm.; pleural three distal width, 27.7 mm.; bridge length, 127.0 mm.(?). Where applicable the above dimensions are taken along the midline.

LACM 400 (26)/5183, 400(26)/5184, 400(26)/5185 all consist of casts from the same locality that are too badly crushed or eroded to be figured, although they all show enough characters to be placed tentatively with *G. dehiscus*. The specfic name, *dehiscus*, is given as a descriptive reference to the peculiar notched shape of the proneural bone.

Relationships.—With *G. dehiscus* and *G. mohavetus* occurring in the same age deposits and within 60 miles of each other, it is appropriate to point out the characters that are used to distinguish the two species, (Tables 3, 5).

Generic assignment of fossil tortoises is made with no evaluation of and with generally poor, often ambiguous characters. This is well borne out by the changes of generic and subgeneric assignment many species have experienced. *G. dehiscus* has been assigned to the genus *Gopherus* on the basis of characters used by Ernest Williams as they appear in Oelrich (1957). Characters in *G. dehiscus* that indicate the genus *Gopherus* are:

a. The high, flattened dome is produced by three longitudinal ridges, (Fig. 3A).

b. The fourth vertebral scute is much wider than long.

c. The vertebral scutes are broader than the length of the lateral scutes.

Discussion.—From the same site a single, tentatively identified, fragmentary specimen of *Testudo milleri* Brattstrom was collected.

Since the Barstovian tortoises of Southern California have been variously renamed and recatalogued, Table 4 is presented in an at tempt to clarify any confusion.

Summary

a. A new species of Miocene tortoise, *Gopherus dehiscus*, is described.

b. *G. dehiscus* occurred sympatrically with *Testudo milleri*.

c. The new species resembles *G. mohavetus* of the Barstow syncline area, but differs from it in several characteristics.

d. A summary of Barstovian aged tortoises of Southern California is given.

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